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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/532,082

04/21/2005

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EXAMINER

SYKES, ALTREV C

ART UNIT

PAPER NUMBER

1794

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DELIVERY MODE

06/05/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/532,082	Applicant(s) OCHI ET AL.	
	Examiner ALTREV C. SYKES	Art Unit 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4,7,8,10-12,14-21,23, 24,27-34, 39-41, 46, 47, 52-56 is/are pending in the application.
4a) Of the above claim(s) 14,15,20,21,23,24,27-34,39-41,46 and 47 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☐ Claim(s) ____ is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>2006207, 2006526, 2006613</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Group I, claims 1, 4, 7, 8, 10, and 11 in the reply filed on May 16, 2008 is acknowledged. Applicants traverse the requirement as it applies to groups I and II.
2. The traversal is on the ground(s) that claims 12 and 16 -19 share the same special technical feature as the group I claims and should be included with the group I claims because unity of invention is considered only in relation to the independent claims and not the dependent claims which contain all the features of the independent claim and are directed to the same category of claim as the independent claim. This argument is found persuasive and examiner will include claims 12 and 16-19 in the examination of the elected Group I claims as set forth above. Additionally, newly added claims 52-56 will be added to the elected Group I claims also.
3. As such, claims 14, 15, 20, 21, 23, 24, 27- 34, 39- 41, 46, and 47 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected Group II, III, IV, V, and VI, there being no allowable generic or linking claim.
4. The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 1, 4, 7, 8, 12, 17, 52-53, and 55-56 rejected under 35 U.S.C. 103(a) as being unpatentable over Kawano. (US 4,966,808)

Regarding claims 1, 4, 53, Kawano discloses:

- An aggregate of nanofibers made of a thermoplastic polymer, (See Col 1, lines 8-13 and Col 3, lines 4-15)

wherein single fiber fineness by number average is in a range from 1×10^{-7} to 92×10^{-4} dtex (See Col 2, lines 10-25)

Kawano fails to teach 60%, in fineness ratio, or more of single fibers are in a range from 1×10^{-7} to 2×10^{-4} dtex in single fiber fineness and wherein 50%, in fineness ratio, or more of single fibers that constitute the aggregate of nanofibers are in a section having a width of 30 nm in diameter of the single fibers. It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the fineness ratio since it has been held that, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). The

burden is upon the Applicant to demonstrate that the claimed fineness ratio is critical and has unexpected results. In the present invention, one would have been motivated to optimize the fineness ratio motivated by the desire to provide fibers exhibiting a high tenacity as well as a specific feeling of micro-fiber. (See Col 2, lines 8-10) Kawano discloses that the fibers have a tenacity enough for practical uses and a stabilized spinnability. (See Col 1, lines 59-61) It is further noted that Kawano discloses in the examples test piece of the nonwoven fabric was of 5 cm wide and 10 cm in length in the mechanical direction. (See Col 4, lines 9-11, 45-47, and 60-62) As such it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize the test piece dimensions to obtain the claimed fineness ratio as Kawano does disclose a similar range for the denier of fineness.

Regarding claims 7 and 52 Kawano discloses all of the claim limitation as set forth above. Additionally, Kawano discloses the aggregate of nanofibers wherein:

- the thermoplastic polymer comprises one selected from among polyester, polyamide and polyolefin. (See Col 3, lines 4-15)
- having a morphology like filament-yarn and/or a morphology like spun yarn. (See Col 3, lines 35-45)

Regarding claims 12, 17, and 56 Kawano discloses all of the claim limitation as set forth above. Additionally, Kawano discloses:

- A fibrous material that includes the aggregate of nanofibers. (See Col 3, lines 45-50)

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- the fibrous material is selected from among yarns, a wad of cut fibers, package, woven fabric, knitted fabric, felt, nonwoven fabric, synthetic leather and sheet. (See Col 3, lines 45-50)
- the fibrous material wherein mass per unit area of the fiber is in a range from 20 to 2000 g/m². (See Col 4, lines 1-5)

Regarding claims 8 and 55, Kawano teaches the claimed invention above but fails to teach the aggregate of nanofibers has a strength of 1 cN/dtex or higher or further that the thermoplastic polymer has a melting point of 160°C or higher. It is reasonable to presume that a strength of 1 cN/dtex or higher or further that the thermoplastic polymer has a melting point of 160°C or higher. Support for said presumption is found in the use of like materials and/or like methods which would result in the claimed property. In the instant case, Kawano discloses a similar fiber like that claimed by applicant and produced with like polymeric materials, such as polyolefins, having similar fineness measured in denier. (see Col 4, lines 5-8) It is noted by the examiner that the polyolefin polyethylene has a melting point of 260°C. The burden is upon the Applicant to prove otherwise. *In re Fitzgerald* 205 USPQ 594. In addition, the presently claimed properties would inherently have been present once the Kawano product is provided. Note *In re Best*, 195 USPQ at 433, footnote 4 (CCPA 1977).

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8. Claims 1, 4, 7, 8, 10-12, 16-19, 52-56 rejected under 35 U.S.C. 103(a) as being unpatentable over Buettner et al. (US 6,740,142)

Regarding claim 1, 4, 53, Buettner et al. discloses a filter construction or structure for filtering a particulate from fluids including a gas or a liquid. (See Col 1, lines 10-12) The fine fibers that comprise the nanofiber containing layer can have a diameter of about 0.001 to 2 micron, preferably 0.05 to 0.5 micron. (See Col 3, lines 43-45) It is noted that applicant's disclosure defines 1×10^{-7} to 2×10^{-4} dtex in single fiber fineness to be equivalent to single fiber diameter from 1 to 150 nm. (See [0122]) As such the examiner notes that the 0.001 to 2 micron (1 to 2000 nm) of Buettner et al. encompasses the range of fiber fineness as claimed by applicant. One aspect of the invention is a polymer blend comprising a first polymer and a second, but different polymer (differing in polymer type, molecular weight or physical property) that is conditioned or treated at elevated temperature. (See Col 5, lines 37-41) Preferred materials for use in the blended polymeric systems include nylon 66 copolymers and other linear generally aliphatic nylon compositions. (See Col 5, lines 58-61) Also a single polymeric material combined with an additive. (See Col 6, lines 25-26) The preferred polymers include nylon polymers, polyvinylidene chloride polymers, polyvinylidene fluoride polymers, polyvinylalcohol polymers. (See Col 6, lines 25-33)

Buettner et al. teaches the claimed invention above but fails to teach 60%, in fineness ratio, or more of single fibers are in a range from 1×10^{-7} to 2×10^{-4} dtex in single fiber fineness and wherein 50%, in fineness ratio, or more of single fibers that constitute the aggregate of nanofibers are in a section having a width of 30 nm in

diameter of the single fibers. It is reasonable to presume that the fineness ratio is inherent to Buettner et al. Support for said presumption is found in the use of like materials and/or like methods which would result in the claimed property. In the instant case, Buettner et al. discloses a similar nanofiber to that claimed by applicant made of like polymeric materials and used in a like manner as the final products disclosed by applicant. (See Col 55-59 and 63-68) The burden is upon the Applicant to prove otherwise. *In re Fitzgerald* 205 USPQ 594. In addition, the presently claimed properties would inherently have been present once the Buettner et al. product is provided. Note *In re Best*, 195 USPQ at 433, footnote 4 (CCPA 1977).

Regarding claims 7, 11, 52, and 54 Buettner et al. discloses all of the claim limitation as set forth above. Additionally, Buettner et al. discloses the aggregate of nanofibers wherein:

- the thermoplastic polymer comprises one selected from among polyester, polyamide and polyolefin. (See Col 6, lines 25-38)
- the aggregate contains a functional chemical agent. (See preferred additive in Col 5, lines 48-53 wherein in oleophobicity and hydrophobicity can be provided to the nanofiber)
- having a morphology like filament-yarn and/or a morphology like spun yarn. (See Col 7, lines 53-67)
- the thermoplastic polymer comprises a polymer made through polycondensation. (See Col 7, lines 15-30)

Regarding claim 10 Buettner et al. discloses all of the claim limitation as set forth above, however the reference does not specifically disclose a rate of elongation at absorbing water of 5% or higher in the longitudinal direction of the yarn. Moreover, it is noted that applicant's disclosure states that the aggregate of nanofibers shows greatly improved liquid absorbing capability due to the numerous voids that measure several nanometers to several hundreds of nanometers between the single fibers providing a unique property such as that of an ultra-porous material. (See [0130]-[131]) As such, it is further noted by examiner that Buettner et al. discloses the fine fiber interlocking networks have as important characteristics, fine fibers in the form of microfibers or nanofibers and relatively small spaces between the fibers. (See Col 5, lines 1-4) Such spaces typically range, between fibers, of about 0.01 to about 25 microns or often about 0.1 to about 10 microns. (See Col 5, lines 5-6) Therefore, it is reasonable to presume that the fineness ratio is inherent to Buettner et al. The burden is upon the Applicant to prove otherwise. *In re Fitzgerald* 205 USPQ 594. In addition, the presently claimed properties would inherently have been present once the Buettner et al. product is provided. Note *In re Best*, 195 USPQ at 433, footnote 4 (CCPA 1977).

Regarding claims 8 and 55, Buettner et al. teaches the claimed invention above but fails to teach the aggregate of nanofibers has a strength of 1 cN/dtex or higher or further that the thermoplastic polymer has a melting point of 160°C or higher. It is reasonable to presume that a strength of 1 cN/dtex or higher or further that the thermoplastic polymer has a melting point of 160°C or higher. Support for said presumption is found in the use of like materials and/or like methods which would result

in the claimed property. In the instant case, Buettner et al. discloses a similar fiber like that claimed by applicant and produced with like polymeric materials, such as polyamides, having similar fineness as measured by the diameter. (See Col 3, lines 43-45) Additionally, Buettner et al. discloses the polymeric material provides the physical properties required for product stability. (See Col 6, lines 57-59) The improved polymeric material that can maintain physical properties in the face of incident electromagnetic radiation such as environmental light, heat, humidity and other physical challenges. (see Col 6, lines 63-67) Further, it is noted by the examiner that the polyamide nylon 6 has a melting point of 190°C. The burden is upon the Applicant to prove otherwise. *In re Fitzgerald* 205 USPQ 594. In addition, the presently claimed properties would inherently have been present once the Buettner et al. product is provided. Note *In re Best*, 195 USPQ at 433, footnote 4 (CCPA 1977).

Regarding claims 12, 16- 19 Buettner et al. discloses all of the claim limitation as set forth above. Additionally, Buettner et al. discloses:

- A fibrous material that includes the aggregate of nanofibers. (See Col 12, lines 10-20 and Col 14, lines 5-7)
- the fibrous material contains a functional chemical agent. (See preferred additive in Col 5, lines 48-53 wherein in oleophobicity and hydrophobicity can be provided to the nanofiber and Col 6, lines 56-57)
- the fibrous material is selected from among yarns, a wad of cut fibers, package, woven fabric, knitted fabric, felt, nonwoven fabric, synthetic leather and sheet. (See Col 12, lines 10-20)

- the fibrous material is a laminated nonwoven fabric made by stacking a sheet of nonwoven fabric that includes the aggregate of nanofibers and a sheet of other nonwoven fabric. (See Col 4, lines 63-65 and Col 12, lines 10-20)
- the fibrous material is a fibrous article selected from among clothing, clothing materials, products for interior, products for vehicle interior, livingwares, environment-related materials, industrial materials, IT components and medical devices. (See Col 1, lines 10-30)

Regarding claim 56, Buettner et al. fails to teach the fibrous material wherein mass per unit area of the fiber is in a range from 20 to 2000 g/m². It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the mass per unit area since it has been held that, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Additionally, Buettner et al. discloses the thickness of the typical fine fiber filtration layer ranges from about 1 to 100 times the fiber diameter with a basis weight ranging from about 0.01 to 240 micrograms-cm⁻². (See Col 3, lines 45-48) The burden is upon the Applicant to demonstrate that the claimed mass per unit area is critical and has unexpected results. In the present invention, one would have been motivated to optimize the mass per unit area motivated by the desire to provide a fine fiber capable of being used in a wide variety of filter applications for liquid or gas filtering.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the

various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALTREV C. SYKES whose telephone number is (571)270-3162. The examiner can normally be reached on Monday-Thursday, 8AM-5PM EST, alt Friday. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on 571-272-1254. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/Carol Chaney/
Supervisory Patent Examiner, Art Unit 1794